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# REVIEW OF POWER OPERATION AND MAINTENANCE PROGRAM



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## REVIEW REPORT

Communication and Control

Yuma Projects Office  
Lower Colorado Dams Project Office  
River Control Radio System  
Arizona Projects Office

April 17 - 28, 1989

Lower Colorado Region

Engineering Division  
Denver Office  
Bureau of Reclamation  
UNITED STATES DEPARTMENT OF THE INTERIOR  
Denver, Colorado

April 1989





# United States Department of the Interior

## BUREAU OF RECLAMATION

### DENVER OFFICE



IN REPLY  
REFER TO:  
D-5210

P O BOX 25007  
BUILDING 67, DENVER FEDERAL CENTER  
DENVER, COLORADO 80225-0007

MAY 18 1989

### Review of Power Operation Maintenance Program

#### Review Report

To: Chief, Engineering Division

From: H. D. Bryant, Electronics Engineer

Subject: Review of Power Operation and Maintenance Program, Field Operation/Maintenance Review (Radio Communications), Lower Colorado Region, April 17-28, 1989 (Review of Operation and Maintenance)

#### General

1. The review of radio, microwave, security, and fiber optic (data communication systems) was added this year to the Review of Power Operation and Maintenance Program managed by the Manager, Project Operation Services Staff, Assistant Commissioner - Resources Management (ACRM), Denver Office.

Water and power radio systems were included in this review.

2. This communications review was limited to a physical inspection of selected radio facilities, an inspection of selected repeaters and base stations due for maintenance, and a review of project maintenance records required by Reclamation Instructions Part 254 and Bureau of Reclamation preventive maintenance programs.

With the assistance of Mr. Jim Jones, Electrical Engineer, Regional office, and radio technicians from the Yuma Projects Office and Central Arizona Water Conservation District, I checked a total of thirty-eight radio paths for satisfactory receive signal levels. Eighty-five percent of the paths were satisfactory for data or voice transmissions. Six of the paths were operating with receive signal levels below -90 dBm.

The Yuma Projects Office and the Lower Colorado River Control radio systems are being redesigned; therefore, no corrective action is required at this time.

3. I discussed with the project managers how the Project Operation Services staff could best assist the projects in solving unusual communication problems. Their comments are included in each project's subsection.

4. Mr. Jim Jones and I discussed the results of this review and the proposed content of my engineering report with each project manager as well as the Assistant Regional Director and his staff.

5. A regional exit interview was held with Mr. John D. Brown, Assistant Regional Director, Mr. E. Frank Di Sanza, Regional Engineer, Mr. Jim Jones, Mr. Jon La Vine, Electronic Engineer, Mr. Haydn Lee, Chief, Engineering Division, ACRM, and Mr. Joe Maestas, Chief, Electrical Engineering and Communications Branch.

#### YUMA PROJECTS OFFICE

6. Radio equipment located at the Yuma Projects Office, the Black Mountain repeater site, and the Christmas Tree Pass repeater site was inspected and tested for proper operation.

Radio licenses were posted as required by Reclamation Instructions Part-254.

Maintenance records were satisfactory.

7. The radio paths were operating with satisfactory fade margins and no unusual maintenance or operational situations were brought to the attention of the author.

8. The project's technicians requested specialized fiber optic splicing training.

9. The Yuma Projects Office manager and his staff felt that the Project Operation Services (ACRM) staff could assist them by keeping the project informed about new communication technologies and techniques, by providing current lists of schools or classes specializing in radio/microwave design or maintenance, and by providing a complete list of specialized radio/microwave test equipment owned by the Bureau of Reclamation which could be borrowed by this project.

10. An exit interview was held with Mr. Dave Gudgel, Project Manager, Mr. Jeff Edington, Foreman, Mr. Jim Jones, Mr. Jon La Vine, Mr. Albert Marquez, Acting 410, and Mr. Terry Smith, Yuma Projects Office radio technician.

#### LOWER COLORADO DAMS PROJECT OFFICE

11. Parker Dam and Davis Dam have no Bureau of Reclamation radio systems. The radio communication requirements for these dams are provided under a Regional agreement with the Department of Energy (Western).

12. The very-high-frequency (VHF) and ultra-high-frequency (UHF) radios located at the dams were not tested during this review.

13. No unusual maintenance or operational situations, requiring corrective action, were brought to the attention of the author. The radio coverage problem, which now exists at Headgate Rock, is being resolved by the project engineering staff.

14. The Project Manager and his staff felt that specialized training or test equipment was not required since all of their radio maintenance functions are performed under a private sector contract or by a maintenance agreement with the Department of Energy (Western).

15. The project will require frequency coordination during the redesign of the river control radio system.

The early involvement of the Bureau of Reclamation Radio Frequency Coordinator, D-5210, is necessary to reduce the time required for licensing the new system.

The Chief, Engineering Division, ACRM, Denver Office, will review the project's final radio system design prior to submitting applications for new radio frequency assignments.

Copies of the project's radio design calculations should be sent to the Bureau of Reclamation Radio Frequency Coordinator, D-5210, Denver Office, as early in the design cycle as possible.

16. An exit interview was held with Mr. Ben Wilkinson, Project Manager, Mr. Keith Barrick, Chief, Engineering Division, Mr. Jim Jones, Mr. Jon La Vine, Mr. Haydn Lee, and Mr. Farrell West, Chief, Operations Division.

#### RIVER CONTROL RADIO SYSTEM

17. The Lower Colorado Dams Project Office has maintenance responsibility for this data radio system. Selected equipment located at the Telegraph Pass repeater site, the Black Point repeater site, and the Christmas Tree Pass repeater site was inspected and tested for proper operation.

I could find no radio licenses at the Telegraph Pass repeater site or the Black Point repeater site, as required by Federal Regulations and Reclamation Instructions Part-254. I recommend that the licenses be relocated to the space in each building reserved for site transmitter licenses.

18. Bureau of Reclamation radios and equipment are being maintained by the Department of Energy (Western) technician located in Yuma, Arizona.

The following unusual maintenance or operational situation requires corrective action:

a. The antenna manufacturer, type, orientation, and antenna gain information was missing from the maintenance forms. Mr. Jim Jones had to obtain this information from the technician before the review path-tests could be completed.

I recommend that the project verify that the antenna information required by Bureau of Reclamation Radio Equipment Maintenance Log 7-2200 (8-86) is recorded on all future maintenance reports submitted by Western.

**ARIZONA PROJECTS OFFICE**

19. Selected radio equipment located at the Waddell Dam overlook, the Newman Peak repeater site, and the Harquahala Mountain repeater site was inspected and tested for proper operation.

Radio licenses were posted as required by Federal Regulations and Bureau of Reclamation Instructions Part-254.

Maintenance records were satisfactory and the radio paths were operating with satisfactory fade margins.

20. Bureau of Reclamation radios are maintained by Central Arizona Water Conservation District technicians located in the Deer Valley area. No unusual maintenance or operational situations were observed.

21. The project's engineering staff felt that a general overview of digital as well as certain specialized electronic training would be helpful to them. They suggested that the Project Operation Service (ACRM) staff might investigate the possibility of obtaining such information on 1/2 inch or 3/4 inch video tapes.

22. The Chief, Power Engineering Division, and his staff felt that the Project Operation Services (ACRM) staff could better assist them by providing updated radio/communication maintenance standards. Reclamation Instructions Part-254 lists initial radio system test requirements and Bureau of Reclamation Radio Equipment Maintenance Log form 7-2200 (8-86) lists the minimum acceptable values for operational radio system maintenance.

The project requested that the Project Operation Services (ACRM) staff update Reclamation Instructions Part-254 as soon as possible to reflect the new organizational requirements. The existing version of this instruction is being used until such time as the ACRM organization completes its update of Reclamation Instructions.

The project's engineering design staff needs a Bureau of Reclamation radio design standard that can be used during the construction and design of Bureau of Reclamation communication systems. This type of design standard is the responsibility of the Assistant Commissioner, Engineering and Research, Denver Office, (ACER) organization. I said I would pass along their request to the Project Operations Services staff (ACRM) for further action.

23. An exit interview was held with Mr. Steve Bird, Chief, Power Engineering Division, Mr. Dave Hess, Chief, Communications and Control Branch, Mr. Jim Jones, Mr. Jon La Vine, Mr. Haydn Lee, Mr. Lock Pingree, Electronics Maintenance Supervisor (District), and Mr. John Simmons, Electronics Branch Manager.

## SUGGESTIONS

1. Bureau of Reclamation Radio Equipment Maintenance Log form 7-2200 should be revised to include the "measurement of receive signal levels at all repeater and base stations."

Reclamation Instructions Part-254 now specifies that this reading be taken at the initial installation inspection. However, it does not provide for the continued testing of this important maintenance parameter.

2. It is further suggested that the squelch setting reading be dropped from the Radio Equipment Maintenance Log for 7-2200 since this reading is only used when site interference problems or noise problems are of primary concern.

## RECOMMENDATIONS

1. It is recommended that the Lower Colorado Dams Project engineering staff verify that river control radio frequency authorizations (RFA's) are displayed so they are easily found and clearly visible. See paragraph 17 for details.

2. It is recommended that the Lower Colorado Dams Project engineering staff as well as Mr. Jim Jones, Regional Frequency Coordinator, assure that the proper antenna information is entered on all future maintenance reports. See paragraph 18 for details.

3. It is recommended that the Manager, Project Operation Services Staff (ACRM), Denver Office, consider modifying Bureau of Reclamation Radio Equipment Maintenance Log form 7-2200 (8-86) as described in the suggestion section.



I concur:

  
\_\_\_\_\_  
James D. Sloan  
Chief, Facilities Engineering Branch  
\_\_\_\_\_  
Haydn C. Lee, Jr.  
Chief, Engineering Division





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